

The precipitation on an average for the State was 2.02 below normal. There was a general deficiency east of the one hundredth meridian, while to the westward there was a general excess, with the greatest in the vicinity of Fort Ringgold (Rio Grande City), where it amounted to 1.65. The deficiency for the month ranged from 0.83 to 3.95 over north, central, east, and southwest Texas, and from 0.48 to 4.49 over the coast district, with the greatest over the extreme eastern portion. The greatest monthly amount, 4.03, occurred at Fort Ringgold, while no rain fell at several stations.

Utah.—The mean temperature was 70.0°, or about 2.0° above normal; the highest was 112°, at St. George on the 16th, and the lowest, 21°, at at Soldier Summit on the 10th. The average precipitation was 0.20, or about 0.50 below normal; the greatest monthly amount recorded was 2.00, at Thistle. No rain occurred at St. George, Pahreah, and Park City.

Virginia.—The mean temperature was 71.4°, or 2.3° below normal; the highest was 96°, at Bonair on the 29th and at Cape Henry on the 22d, and the lowest, 35°, at Guinea on the 12th. The average precipi-

tation was 5.27, or 1.59 above normal; the greatest monthly amount, 8.18, fell at Sunbeam, and the least, 1.35, at Birdsnest.

Washington.—The mean temperature was 59.3°, or 0.6° above normal; the highest was 106°, at Moxee on the 28th, and the lowest, 28°, at Cascade Tunnel on the 13th. The average precipitation was 1.64, or 0.26 below normal; the greatest monthly amount, 5.12, fell at Monte Christo, and the least, 0.07, at Moxee.

West Virginia.—The mean temperature was 69.3°, or slightly below normal; the highest was 95°, at Spencer on the 25th, and the lowest, 39°, at Bloomery on the 2d. The average precipitation was 5.35, or more than 1.00 above normal; the greatest monthly amount, 9.86, fell at Monarch, and the least, 2.91, at Spencer.

Wisconsin.—The mean temperature was 66.8°, or about 1.0° below normal; the highest was 95°, at Appollonia on the 22d and at Bayfield on the 30th, and the lowest, 29°, at Antigo and Mayford on the 1st. The average precipitation was 3.37, or slightly below normal. The greatest monthly amount, 6.83, fell at Viroqua, and the least, 0.51, at Crandon.

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KITE EXPERIMENTS AT THE WEATHER BUREAU.

By C. F. MARVIN, Professor of Meteorology, U. S. Weather Bureau.
[Continued from the MAY REVIEW.]

FORMS AND CONSTRUCTION OF THE WEATHER BUREAU KITES.
[Continued.]

Characteristics of wing surfaces.—The cross-section of the wings of birds presents characteristics that are very different, as a rule, from those of a section of the surfaces ordinarily employed in kites. As wings are evidently highly efficient sustaining surfaces, we may do well to analyze their form carefully and inquire to what extent and in what respect those forms may be copied with advantage in constructing kites. Aside from the arched form commonly characteristic of wings and which in the same wing probably varies more or less in amount with changes of pressure, we observe that the front edge is firm, rigid and thick, and that the wing becomes thinner and more flexible towards the rear edge, which is elastic and quite pliable under comparatively feeble forces. Much has been written concerning the advantages of these peculiarities by some who have sought to solve the mysteries of the sailing flight of large birds.

Without entering here into a detailed analysis of the action of the wind pressure upon a wing and its reaction thereto, I am convinced that the peculiar usefulness various writers seek to attribute to every detail of the wing structure is very much exaggerated and overdrawn. At least grave errors and misconceptions have resulted because a sharp distinction has not been drawn between the essentially different use of its wings made by the bird when employed in gliding or sailing flight on fixed wings, as contrasted with flight by flapping the wings.

The action of the wind upon the wings of sailing birds is similar in several respects to the action of wind upon kites whereas, nothing in the action of ordinary kites resembles the wing-flapping of birds. Therefore, whatever qualities of wing surfaces are of special advantage in sailing flight may also be of advantage in kite surfaces. By far the most important of these is the arched character of wing surfaces, the advantages of which have already been noticed. In addition to this we observe that the wing is thick on the front edge. It seems hardly possible that any other consideration than that of strength alone can determine what this thickness should be. If nature could make a wing of adequate strength but yet with a smaller sectional area, she would do